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THE GRAY HERBARIUM EXPEDITION TO NOVA SCOTIA,  
1920

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(Plate 130)

PART I. JOURNAL OF THE EXPEDITION.<sup>1</sup>

AT first thought Nova Scotia would hardly occur to the student of our vascular floras as a particularly inviting field for a summer's expedition. The province is one of the longest-settled and most visited regions of North America; the area best known to tourists, "the Valley" (the valleys of the Cornwallis and Annapolis Rivers), being closely cultivated and widely exploited as the "Evangeline Land," the home of Nova Scotian farms and orchards. The wildest region of the province, the northern half of Cape Breton Island, geologically, physiographically and floristically very different from Nova Scotia proper, has already attracted several discriminating collectors and has been carefully treated, from the ecological viewpoint at least, by Nichols,<sup>2</sup> whose work on the region has been called "by far the most important ecological study yet made on the vegetation of northeastern America."<sup>3</sup> The veteran Government Naturalist, the late Professor John Macoun, repeatedly collected in all parts of the province; and the local botanists who, in Nova Scotia

<sup>1</sup> Read before the New England Botanical Club, February 4, 1921.

<sup>2</sup> Nichols, *The Vegetation of Northern Cape Breton Island, Nova Scotia*. Trans. Conn. Acad. Arts and Sci. xxii. pp. 249-467 (1918).

<sup>3</sup> Ganong, *RHODORA*, xxi. 171 (1919).

as almost everywhere else, were more active in the field a generation or two ago than at the present period of narrow specialization or indifference to the tremendous problems of natural history, have published numerous local lists and records, including the *Catalogue of the Flora of Nova Scotia* by Lindsay.<sup>1</sup> Professor Sommers's *Introduction* to the latter work gives a pretty strong intimation that there is little left to be learned regarding the vascular element of the Nova Scotian flora, an impression surely conveyed by the following words: "it may be accepted as the most complete synopsis of the Nova Scotian Flora yet offered . . . while the P[h]anerogamia exclusive of Cyperaceae and Gramin[e]ae are nearly complete, the Cryptogamia, excepting Filices and Lycopodiaceae, are but sparingly represented." Furthermore, one of the most acute Nova Scotian botanists of recent years, the late Dr. Charles Budd Robinson, has stated that, "In general, the flora of the peninsula and island is composed of plants which have migrated from the west or southwest through New Brunswick;"<sup>2</sup> the other elements of the Nova Scotian flora recognized by Robinson being the introduced weeds and, in northern Cape Breton, "a third element, namely, species that are believed not to occur anywhere upon the peninsular portion of the province," in illustration of which 8 species are mentioned, some of which, like *Habenaria blephariglottis*, *Aster nemoralis* and *Drosera intermedia*, are not only found on the peninsula but are there dominant plants over hundreds of square miles of acid bog. In fact, Professor L. W. Bailey, in his report on the geology of Yarmouth and Digby Counties had specially commented on "the abundance of orchids, . . . The most common species . . . is the white-fringed orchis (*Habenaria blephariglotis*, Hook)."<sup>3</sup> It would thus seem, that the students of our northeastern flora, desirous of spending the summer in the field to the best advantage and restrained by the present state of transportation-facilities and of manpower from the exploration of less accessible regions of Gaspé, Newfoundland or Labrador, would be almost wasting time by concentrating on Nova Scotia.

Nevertheless, outside the very general collections of Professor Macoun there exist, in this country at least, comparatively few

<sup>1</sup> A. W. H. Lindsay, Proc. and Trans. N. S. Inst. Nat. Sci. iv. pt. 2, 184-222 (1877).

<sup>2</sup> C. B. Robinson as reported in Torreyia, vi. 257 (1906).

<sup>3</sup> L. W. Bailey, Geol. Surv. Can. Ann. Rep. n. s. ix. 18M (1898).

specimens to represent Nova Scotia; and when a prominent present-day Nova Scotian botanist, asked about some critical species he is supposed to have discovered, replies that his only available evidence is a marginal memorandum in the *Manual*, it seems time that we learn what actually grows in the Province. Furthermore, in spite of the rather extreme generalization of Professor Sommers, that "The subarctic character of our [Nova Scotian] flora will be observed from a study of our list" and the fact that the list has less than forty subarctic species and that this and other lists indicate a prevailingly Canadian and Alleghenian flora with forests of spruce, larch, fir, white pine, red pine, canoe birch, white ash, sugar maple, American elm, beech, red oak and hop hornbeam, we had a few indications of the presence in Nova Scotia of southern coastal plain plants,—just enough to stimulate the imagination.

The best known example of the very few characteristic coastal plain plants which we knew to be in Nova Scotia is *Schizaea pusilla*, the famous Curly Grass of the New Jersey pine barrens and of the Newfoundland barrens, an isolated representative in eastern North America of a large genus of the tropics and the southern hemisphere. Between the pine barrens of New Jersey and Nova Scotia *Schizaea* is quite unknown, although repeatedly sought on Long Island, Nantucket and Cape Cod, and in peninsular Nova Scotia its occurrence has rested solely upon a single colony discovered in July, 1879, by Mrs. Britton,<sup>1</sup> whose station was very limited for, as she has reported, she "collected . . . nearly all there were" and "Prof. Mackay, of Nova Scotia, has since searched in the locality where I found it, but in vain."<sup>2</sup> Subsequently *Schizaea* has been found on the barrens of Cape Breton by Nichols, but not on the mainland of Nova Scotia.

Another coastal plain plant, the Inkberry, *Ilex glabra*, was in Lindsay's *Catalogue*, on the authority of Sommers, as found at Halifax; but, with no specimens known from east of Massachusetts, the record seemed too doubtful and the species was excluded by Macoun in 1883 from Part 1 of his *Catalogue of Canadian Plants*. In 1886, however, Macoun reinstated it, for in the meantime he had himself collected it near Halifax and received material from Shelburne.

<sup>1</sup> E. G. Knight, as reported in Bull. Torr. Bot. Club, vii. 1 (1880); Gray, Bot. Gaz. v. 4 (1880).

<sup>2</sup> E. G. Britton, Linn. Fern Bull. iv. 18 (1896).

Other coastal plain plants in Lindsay's list are *Woodwardia virginica*, *Corema Conradii* and our two species of *Hudsonia*, Nova Scotian specimens of which have been well known, and the following for which vouchers have been lacking: *Cupressus* (now *Chamaecyparis*) *thyoides*, *Eriocaulon decangulare*, *Xyris bulbosa* (now *X. torta*), *Juncus marginatus*, *Ilex opaca*, *Solidago odora* and *Coreopsis* (now *Bidens*) *discoidea*.

The latter list has always been treated as based on errors of determination, although the verification of the occurrence in Nova Scotia of *Ilex glabra*, the fully authenticated occurrence there of *Schizaea pusilla* and the recent discovery<sup>1</sup> there of a single plant of the Golden Crest, *Lophiola*, a genus supposed to reach an isolated northern outpost in the pine barrens of New Jersey, have tended to render Lindsay's list less incredible. Furthermore, we must not forget that specimen of *Ceratiola ericoides* Michx.<sup>2</sup> recorded as long ago as 1842 by Edward Tuckerman. *Ceratiola* is a monotypic genus of shrubs of the *Empetraceae*, supposed to be restricted to pine barrens from South Carolina to Florida and Alabama. But Tuckerman, in recording the occurrence in Lambert's herbarium of *Corema Conradii* (as *Oakesia*), said to have come from "Newfoundland, Cormack," appended this important note:

"The small label at the top of the sheet which contains this specimen (apparently not original) reads as follows:—'*Cistus?* from Nova Scotia.' Above has been written by the late Prof. Don '*Ceratiola ericoides* [*ericoides*],' in the same envelope with a fine and female specimen of which plant it is, singularly, placed."<sup>3</sup>

Whether the *Ceratiola* actually came from Nova Scotia had, of course, long been in doubt, but in view of other pine barren species demonstrated to occur there, the shrub was worth keeping in mind.

Altogether, the list of southern coastal plain plants reported from Nova Scotia numbered between 30 and 40, some of them without vouchers; others, like *Schizaea pusilla*, *Lophiola* and *Ilex glabra*, supported by actual modern specimens. They had all been discovered or reported at scattered intervals and mostly by different observers and it seemed apparent that they must be extremely local plants. In view of the occurrence, especially in eastern Newfound-

<sup>1</sup> See Nichols, RHODORA, xxi. 68 (1919).

<sup>2</sup> In this report the authors are included only for species not in Gray's Man., ed. 7.

<sup>3</sup> Tuckerm. in Hook. Lond. Journ. Bot. i. 445 (1842).

land, of a large coastal plain element,<sup>1</sup> and the fact that several such species, unknown in adjacent New Brunswick and eastern Maine are obviously isolated on Nova Scotia as remnants of the flora which in the late Pleistocene or even later had lived on the then elevated but now submerged continental shelf, it became very evident that not only was there plenty of good botanizing left in peninsular Nova Scotia but that the region must hold some secrets of profound importance to a clear understanding of the history of life in eastern America.

And since the least botanized and least cultivated region of the peninsula happens to be the area of highly silicious and mostly acid quartzites and slates extending from Digby County around the coast via Yarmouth and Shelburne to Halifax, thence on to Canso, constituting the "gold-bearing series" of the province, and the great granite masses which are interspersed through the quartzite area, it seemed probable that good results would be obtained by devoting a season to these formations. The silicious rocks of the gold-bearing series are essentially identical with the Avalonian formation of southeastern Newfoundland, where have been found many species isolated, some from the South, some from Atlantic Europe. In the silicious regions of Cape Cod and of Newfoundland the most fruitful habitats have always proved to be the boggy barrens and the pond-shores and, upon studying the detailed topographic maps of Nova Scotia, it was consequently a most promising sign, to find that in the belt of Avalonian and granitic rock there are no fewer than 2,600 lakes and fresh-water ponds, as well as an endless profusion of bogs, savannahs and barrens, vastly more than in the other half of the province, where a count shows fewer than 800 lakes.

There was, therefore, no further doubt about the region to be explored and a summer's campaign was made possible through the liberal support of such generous friends as Colonel John E. Thayer and Mr. Walter Deane and the cooperation of Dr. William McInnes, Directing Geologist of the Geological Survey of Canada, and of Mr. R. R. Farrow, Canadian Commissioner of Customs. Through the helpful interest of Professor Kenneth G. T. Webster of Harvard University and his brother, Dr. Charles Webster of Yarmouth, a suitable home with a dry barn was secured in the latter town and,

<sup>1</sup> See Fernald, *RHODORA*, xiii. 135-162 (1911); *Am. Journ. Sci.* ser. 4, xl. 17 (1915); *Am. Journ. Bot.* v. 238 (1918).

as it seemed quite appropriate that the flora of New Scotland should interest botanists of New England, invitations were sent to a number of members of the New England Botanical Club to join for such time as they could during the summer in making as complete a survey as possible of the vascular flora of western Nova Scotia. Altogether there were eight in the party,<sup>1</sup> though not all at one time. 5000 sheets of drying paper, nearly as many corrugated "ventilators," a large stock of white pressing paper, seven large collecting boxes, ten presses, a bushel of flake naphthaline (to keep out mold and hasten drying of "soggy" specimens) and the other necessary equipment (to the extent of 16 heavy freight boxes) were shipped from the Gray Herbarium to Yarmouth, where they are entered as consigned by "Messrs. Grey, Hubanning & Co., Boston;" and on July 1st four members of the party left Boston. I was slightly delayed in starting and saw Bissell, Long and Linder leave on the early-morning train without me, to be joined en route by Pease. Their first landing in Nova Scotia was at Digby, where, waiting for the train to Yarmouth, they made the acquaintance of the village weeds and collected for the first time the beautiful Ladies' Mantle, *Alchemilla vulgaris*,<sup>2</sup> afterward found to be one of the most obnoxious though handsome weeds of western Nova Scotia; *Sedum stoloniferum*, then only in bud, but later, when its pink petals were expanded, seen along several roadsides around the coast as far as Barrington; and *Silene gallica*, a somewhat unusual ballast weed. On the marshes *Puccinellia maritima*,<sup>3</sup> was in fine condition, a characteristic plant of Massachusetts marshes, afterward found to be very generally distributed on the coast of Nova Scotia.

When I arrived on July 6 at Mrs. Frank Davis's, where we had most comfortable and home-like quarters, presses of specimens were out-doors by the barn enjoying one of the last sunnings for several weeks. In the absence of maps, which were in my trunk, the advance

<sup>1</sup> The members of the party and the periods of their stay in Nova Scotia follow:

RALPH C. BEAN, July 16–July 30.

CHARLES H. BISSELL, July 2–July 23; August 11–September 2.

MERRITT L. FERNALD, July 6–September 9; October 6–8.

DR. AND MRS. CHARLES B. GRAVES, August 10–August 24.

DAVID H. LINDER, July 2–September 9; October 6–8.

BAYARD LONG, July 2–September 9.

ARTHUR STANLEY PEASE, July 2–July 21.

DONALD WHITE, July 16–August 6.

<sup>2</sup> See Fernald & Wiegand, RHODORA, xiv. 232 (1912).

<sup>3</sup> See Fernald & Weatherby, RHODORA, xviii. 6 (1916).

guard had conscientiously weeded the wharves and roadsides of Yarmouth, so that we should not later have them much on our minds: *Alopecurus geniculatus* and *Myosotis scorpioides* in the ditches; *Rumex Acetosa*, with its tall red wands, picturesque in the fields; *Achillea Millefolium*, mostly with deep rose-colored rays, common by roadsides; numerous garden-escapes,—*Convallaria majalis*, *Salix purpurea* in great abundance, *Crataegus monogyna* Jacq., the ubiquitous hawthorn of hedges, *Iris Pseudacorus* well established by many pools, *Lysimachia punctata* and *Veronica longifolia* in numerous thickets, and, it would seem, almost every hardy garden perennial, here luxuriating in the foggy and misty atmosphere and spreading freely to the roadsides; and, in rubbish, such unusual plants as *Vicia angustifolia* Reichard, var. *uncinata* (Desv.) Rouy & Foucaud, which Wiegand and I had found on the Maine side of the Bay of Fundy,<sup>1</sup> and a dwarf variety of *Trifolium pratense*, with low stems (1–2 dm. high) and very small leaves with rounded obovate leaflets only 0.5–1.5 cm. long, a plant which J. F. Collins, Pease and I had found naturalized at various points near the tip of the Gaspé Peninsula in 1904 and which seems to be referable to the European var. *frigidum* Gaud.<sup>2</sup>

In more natural habitats they had been getting, on springy and peaty slopes, many good things: *Carex panicea* and *C. leporina*, both rare species in North America, and *Sieglingia decumbens* (L.) Bernh., the characteristic Heath Grass of peaty soils of western Europe, also common on boggy slopes in eastern Newfoundland,<sup>3</sup> but not generally recognized as occurring on the American continent. Here, as elsewhere in Yarmouth County, it was invariably in half-natural habitats where it might be indigenous, but always too near civilization and pastures for us yet to feel confident that it is native. It is a neat grass, forming dense tussocks, with slender, wiry culms, and inflorescences which superficially so suggest *Danthonia* as to explain why Linnaeus placed this plant in that genus. The open places were bright with three or four species of *Sisyrinchium*: the common northern *S. angustifolium* and, quite as common if not more general, the two southern species, *S. gramineum* and *S. atlanticum*. The

<sup>1</sup> See Fernald & Wiegand, RHODORA, xii. 140 (1910).

<sup>2</sup> *T. pratense* L., var. *frigidum* Gaud. Fl. Helvet. iv. 582 (1829). *T. nivale* Sieb. Herb. Fl. Austr. no. 236, acc. to Koch. *T. pratense*,  $\gamma$  *nivale* (Sieber) Koch, Syn. Fl. Germ. 168 (1835).

<sup>3</sup> See Fernald, Am. Journ. Bot. v. 229, fig. 13, and 243 (1918).

former of these two extends to Newfoundland,<sup>1</sup> but west of Nova Scotia reaches its northeastern limit in the lower Penobscot valley; while *S. atlanticum* has heretofore been unknown northeast of southern York County, Maine. On open gravelly soil Pease and Linder had also found a plant which so closely matches *S. arenicola* of the sands of New Jersey, Long Island and Nantucket that there can be little question as to its identity. The Yarmouth material, however, seems like a starved *S. gramineum* with the short and stiff basal fibres (one of the chief characters) persistent perhaps through a response to ecological conditions, while material which Pease, Long and I subsequently found on dry plains at Middleton, Annapolis County, seems like *S. angustifolium* except for the stiff and persistent tufts of basal fibres. May it not be that *S. arenicola*, instead of being a true species, is an ecological state due to the sandy substratum in which it grows?

But still more interesting was the discovery that the spruce bogs, besides having the plants one would naturally expect (the boreal *Carex paupercula*,<sup>2</sup> *C. pauciflora*, *Smilacina trifolia*, *Vaccinium Oxycoccus*, *Empetrum nigrum*, etc.), shelter along with the already well known coastal plain *Carex atlantica* Bailey (*C. sterilis* of the Manual)<sup>3</sup> and *C. exilis*, the delicate little southern *C. Howei* Mackenzie,<sup>4</sup> the plant treated in the 7th edition of Gray's *Manual* as *C. scirpoides*, var. *capillacea* but clearly a distinct species of the coastal plain. *C. Howei*, which extends in New England north to the lower Merrimac, is from Cape Cod southward one of the dominant plants of the so-called Louisianian and Carolinian Cypress (*Chamaecyparis*) swamps, but throughout western Nova Scotia it is quite as dominant a sedge of the "Hudsonian" spruce swamps (fig. 1). Another

<sup>1</sup> See Bicknell, Bull. Torr. Bot. Cl. xxvii. 238 (1900) and Fernald, Am. Journ. Bot. v. 243 (1918).

<sup>2</sup> There seems no good reason to recognize vars. *irrigua* (Wahlenb.) Fernald and *pallens* Fernald. Fifteen years of field-work since they were proposed shows them to be only trivial variants.

<sup>3</sup> *C. sterilis* Willd. has been variously misunderstood, but Mackenzie (in Britton & Brown, Ill. Fl., ed. 2, i. 377) seems to have reached a satisfactory solution of its identity: a very distinct but little-collected species of limestone regions from Newfoundland and Anticosti westward to Minnesota, and south through the limestone region of western New England to northern New Jersey, Pennsylvania, etc. This plant, until recently merged with *C. interior* Bailey (*C. scirpoides*, at least of my own treatments), differs from it in having very rough beaks which barely exceed the broad and very long brown scales. The coastal plain plant which I have called *C. sterilis* is mostly *C. atlantica* Bailey.

<sup>4</sup> Mackenzie, Bull. Torr. Bot. Cl. xxxvii. 245 (1910).



southern sedge which they had been finding common in swales, and which we afterward saw everywhere we went in the Avalonian formation but nowhere else, is the characteristic plant of swamps of southern New England, *Carex bullata*, var. *Greenei*, found from Georgia north to York County, Maine, but like *C. Howei* and *Sisyrinchium atlanticum* not previously known to occur in Canada.

On July 7 we started explorations a little more remote from Yarmouth; Bissell, Pease and Linder going to the local summer resort, Lake Annis, where *Ilex glabra* and *Smilax rotundifolia* had been reported, and from there walking north a few miles to Hectanooga station; Long and I going to Meteghan station to explore an extensive spruce and larch bog, the "caribou barren," which we had noted from the train. On the way north, as we closely watched the country from the car-windows, we were puzzled to understand how the *Smilax* and the *Ilex* could be found in this region of spruce, fir and larch forest and cold boggy barrens and as this impression grew upon us we did not hesitate to express great scepticism, for it seemed so obvious that, if *Smilax*, *Ilex glabra* and *Schizaea* really did occur in this Canadian and Hudsonian region, they must lurk in some very localized pockets not visible from the train.

The Lake Annis party failed to locate either of the specialties and brought back a very characteristic lot of plants of ordinary spruce woods and bogs, with the first Dwarf Mistletoe, *Arceuthobium pusillum*, of the season, although later the "arceuthobiate" spruces were regularly seen and as the season advanced we secured beautiful material of the parasite which made these first specimens seem hardly worth preserving. They also had *Senecio Robbinsii*, which we had seen abundantly from the train, this beautiful species apparently everywhere replacing *S. aureus* in the extensive silicious region. They had the southern High-bush Blueberry, *Vaccinium corymbosum*, in perplexing variety; *Pyrola rotundifolia*, var. *arenaria* Mert. & Koch, which we had known from Newfoundland<sup>1</sup> but not farther south, although we continued through the summer to find it, always rather scarce, on sandy barrens as far east as Middleton, Annapolis County; and wonderful material of the fructiferous *Equisetum limosum*, forma *polystachium* (Brueckn.) Doell.<sup>2</sup>

Starting south from Meteghan station, Long and I quickly found ourselves seduced into collecting *Rubus*, a genus which he and the

<sup>1</sup> See Fernald, RHODORA, xxii. 122 (1920).

<sup>2</sup> See Fernald & Weatherby, RHODORA, xxiii. 77 (1921)

others had nobly attended to around Yarmouth; but after nearly filling out man's size collecting boxes with blackberry canes, we were attracted by a very handsome and distinct *Antennaria* on the dry embankment, the foliage suggesting very large *A. neodioica* but the large heads with a strong crimson tinge suggestive of *A. Parlinii*. This was something neither of us had ever seen growing, so we compressed the blackberry specimens (and made a necessary screen over them with large leaves) to make room for a fine lot of the *Antennaria*, and whenever we subsequently saw it, as we did several times and as far east as Hants County, we were regularly struck with its great beauty. The plant proves to be my own *A. neodioica*, var. *grandis*, a well marked extreme of a polymorphous species, which I had known only through herbarium material; and, although in the field it looks very distinct, I am unable to find a single character by which it can be specifically separated.

Striking out into the wet mossy bog we were interested to find *Potentilla canadensis*, var. *simplex* of dry fields in New England and the eastern States generally and the Checkerberry, *Gaultheria procumbens*, of our dry pastures and woods, growing in deep, wet sphagnum along with the other bog plants, *Andromeda glaucophylla*, *Kalmia polifolia*, *Carex paupercula*, *C. pauciflora*, *Eriophorum angustifolium* and *Vaccinium Oxycoccus*; but we were not wholly surprised, for Long had been collecting the *Potentilla* in wet bogs about Yarmouth and I had known *Gaultheria* as a wet-bog species on the Gaspé Peninsula.<sup>1</sup> Crossing the bog, we soon came into carpets of the arctic Crowberry, *Empetrum nigrum* (fig. 2), common enough at Yarmouth, but here in the cold bog retaining its flowers unusually late into the summer, still in such good condition that we had the satisfaction for the first time in our experience of securing good staminate material. And there close to *Empetrum*, right in the middle of an otherwise almost typical Hudsonian bog was the Inkberry! We could hardly believe our eyes but there was the glossy-leaved *Ilex glabra* (fig. 3), much smaller than on Cape Cod or in New Jersey, Florida or Alabama, but healthy and just beginning to bloom. In the spruce woods at the edge of the bog the High-bush Blueberries were as perplexing as on Cape Cod or in New Jersey, but here there were some forms which we had not previously met.

After a day of work on the presses we were ready to try the country southward, Long and Pease ("Longipes" of our field-notes) trying

<sup>1</sup> See Fernald, RHODORA xiii. 97 (1911).

the region of open, boggy barrens east of Argyle Head; Bissell, Linder and I examining the granitic coast of extreme southwestern Nova Scotia at Shag Harbor. We got into a typical Hudsonian bog region like bits of the outer coast of eastern Maine<sup>1</sup> or of Newfoundland, with their great abundance of Bakeapple (*Rubus Chamaemorus*), *Carex pauciflora*, *C. trisperma*, var. *Billingsii*, *Empetrum nigrum*, and swales of *Eriophorum callitrix* or interrupted turf of *Scirpus cespitosus*, var. *callosus* Bigelow.<sup>2</sup> Around the shores were the usual coastal plants of this latitude, such as *Elymus arenarius*, var. *villosus* E. Meyer,<sup>3</sup> *Coelopleurum lucidum* (L.) Fernald,<sup>4</sup> and *Euphrasia purpurea* Reeks, var. *Randii* (Robinson) Fernald & Wiegand, but here apparently all belonging to the white-flowered forma *albiflora* Fernald & Wiegand;<sup>5</sup> and the only traces of a coastal plain flora noticed were the ubiquitous *Sisyrinchium atlanticum*, *Carex atlantica* and *C. bullata*, var. *Greenei* and the almost ubiquitous Bog Huckleberry, *Gaylussacia dumosa*, var. *Bigeloviana* Fernald,<sup>6</sup> northern bog variant of a wide-ranging coastal plain species.

But when, returning to Yarmouth, Long and Pease joined us on the train, although they had some boreal species, such as *Scirpus cespitosus*, var. *callosus* and *Carex oligosperma* (boreal, but found on Cape Cod), they showed a very different lot of plants from the bog-barrens east of Argyle Station and the peaty and sandy soil about Sand Pond. They were beaming over the prompt discovery of *Schizaea pusilla* (fig. 11), a young *Bartonia*, a young *Xyris* suggesting the coastal plain *X. caroliniana* and, in flower, the northern representative of the genus, *X. montana*, a young *Solidago* of the subgenus *Euthamia*, obviously related to the coastal plain *S. tenuifolia*, *Eleocharis Robbinsii* of coastal plain sloughs south to Florida, *Panicum spretum*, a common species of the coastal plain south to Texas, *Calamagrostis Pickeringii*, var. *debilis* Fernald & Wiegand, heretofore unknown<sup>7</sup> between eastern Massachusetts and Newfoundland, *Lycopodium inundatum*, var. *Bigelovii* (*L. adpressum* (Chapm.)

<sup>1</sup> See Fernald & Wiegand, RHODORA, xii. 106 (1910); Knowlton, RHODORA, xvii. 148, 149 (1915).

<sup>2</sup> See Fernald, RHODORA, xxiii. 24 (1921).

<sup>3</sup> See St. John, RHODORA, xvii. 99 (1915).

<sup>4</sup> RHODORA, xxi. 146 (1919).

<sup>5</sup> RHODORA, xvii. 188 (1915).

<sup>6</sup> RHODORA, xiii. 99 (1911).

<sup>7</sup> RHODORA, xv. 135 (1913).

Lloyd & Underw., *L. Chapmani* Underw.),<sup>1</sup> a coastal plain extreme of the species extending from Louisiana via Florida to eastern Massachusetts but heretofore unknown northeast of Plum Island and the famous Round Pond at Tewksbury (Massachusetts), where it is one of a very notable group<sup>2</sup> of isolated coastal plain plants; and, best of all, the tiny bladderwort, *Utricularia subulata*, both the showy form with expanded orange corollas and the cleistogamous state with minute creamy or whitish flowers; for *Utricularia subulata* is one of the most characteristic plants of wet barrens all the way from Brazil, via the West Indies, to southern New Jersey, north of there an exceedingly rare species, known from a single station on Long Island and very locally indeed on Martha's Vineyard, Nantucket and Cape Cod (fig. 4). This was indeed pretty thrilling and our excitement, as we were shown one after another the different finds, quickly stimulated the curiosity of the brakeman, who stopped for a lesson in a subject obviously quite new to his experience.

In his account of the distribution of forest trees of Canada, Robert Bell stated that the northern White Cedar, *Thuja occidentalis*, "is absent from . . . Nova Scotia;"<sup>3</sup> and in his enumeration of the trees of Nova Scotia, Fernow<sup>4</sup> does not list the species. But in

<sup>1</sup> Many botanists maintain as distinct species the circumpolar *L. inundatum* and the endemic American coastal plain *L. adpressum* and *L. alopecuroides*, although in Britton & Brown's *Illustrated Flora* (ed. 2, i. 44) *L. inundatum*, var. *Bigelovii*, the type of which is quite identical with Georgia, Florida and Louisiana specimens of *L. adpressum*, is treated as a variety of *L. inundatum*: "Slender elongate forms, mainly from New England . . . ; they indicate a possible transition into the next species [*L. adpressum*]." On Cape Cod and in Nova Scotia the transition is very apparent and no sharp specific line can be drawn between *L. inundatum* and *L. adpressum*. *L. alopecuroides*, with its great development of bristly ciliation, would seem, from its more typical specimens, to be well marked, but in his *Plants of Southern New Jersey* Stone says (p. 141): "We certainly have a chain of connecting links in our New Jersey bogs between *L. chapmanii* [or *L. adpressum*] and *L. alopecuroides*." It is thus apparent that, in 1843, Tuckerman worked out the proper treatment of these plants:

"*L. inundatum* . . . .— $\beta$ . *Bigelovii*, (mihi): majus, ramis subramosis elongatis, foliis acuminatis sparsim denticulatis s. integris. *L. Carolinianum*, Bigel. Fl. Bost. p. 384.— $\gamma$ . *alopecuroides*, (mihi): caule ramisque ut  $\beta$ . foliis lineari-subulatis basi sparsimque ciliato-dentatis. *L. alopecuroides*, L. . . . ( $\beta$ .) Wet, sandy margins of ponds; Plymouth, Oakes and Tuckerman; (also New Jersey?).—( $\gamma$ .) Florida, Torrey. . . . The variety *alopecuroides*, if this view be correct, is the extreme southern American form of the species, the variety *Bigelovii* intermediate, and perhaps not occurring north of Massachusetts, and  $\alpha$ . the extreme northern state, common to us with Europe."—Tuckerm., Am. Journ. Sci. xlv. 47, 48 (1843).

<sup>2</sup> See Fernald, RHODORA, xiii. 247 (1911).

<sup>3</sup> R. Bell, Geol. Surv. Can. Rep. for 1879-80, 47C (1881).

<sup>4</sup> Fernow, Forest Conditions of Nova Scotia, 11 (1912).

Lindsay's *Catalogue* it is recorded from Cumberland County, north of the main peninsula of Nova Scotia and Professor H. G. Perry has reported it<sup>1</sup> as scarce in the west-central portion of the province. Lindsay also records the coastal plain Cypress or Cedar, *Chamaecyparis*, and Nichols has surmised<sup>2</sup> that a reputed Juniper on Digby Neck may prove to be *Chamaecyparis*. Consequently, when we discovered on Fernow's map that in Digby County there are two bodies of water called "Cedar Lake," one at the head of Tusket River, east of Corberrie, the other, lying partly in Yarmouth County, northeast of Port Maitland, and giving the name to Cedar Lake post-office, we promptly made inquiries about the tree which had suggested the name. The inquiries, as usual, were fruitless, so on the afternoon of July 11, having time for a short ride, we went by automobile to the nearer (the latter) Cedar Lake to settle the question ourselves. On the way we paid our respects to *Rubus*, especially to one ugly old brier with a profusion of fierce prickles, glands and hispidity, the dominant blackberry of the region, which was promptly dubbed by our *romantic* classicist "*filius diaboli*," a shrub strongly simulating the coastal plain *R. Andrewsianus* Blanchard but with strongly hispid as well as prickly and glandular canes.

On a roadside near Darling Lake was the small yellow clover, *Trifolium dubium*, a common weed from Cape Cod southward, afterward found by us at other stations in Yarmouth County as far south as Belleville. North of Port Maitland the road passed near the southern end of Beaver Lake and we were so attracted by the tremendous inundated swale at its border, that we felt justified in taking a few minutes from the short time available for Cedar Lake to sample it. The swale was a typical one, with a profusion of *Scirpus acutus* Muhl.,<sup>3</sup> *Cladium mariscoides*, *Panicum spretum*, *Carex polygama*, *Pogonia ophioglossoides*, etc., and with them the usually maritime *Triglochin maritima*, here in highly acid peat.

As we approached Cedar Lake we came upon a swale showy with *Potentilla fruticosa* which we had not seen before and which, with its predilection for neutral or even calcareous soils, suggested that if any cedar still grew in the region it would be *Thuja*. Accordingly we were prepared, as the road came close to the lake, for the beautiful

<sup>1</sup> See Fernald, RHODORA, XXI. 55 (1919).

<sup>2</sup> G. E. Nichols, RHODORA, XXI. 68 (1919).

<sup>3</sup> See Fernald, RHODORA, XXII. 55 (1920).

growth of *T. occidentalis* which fringes the southwestern banks of the lake. It was not so thrilling a sight as a *Chamaecyparis* swamp would have been but it definitely disposed of the tradition that *Thuja* does not grow in Nova Scotia. The belt of cedar is only a few yards wide, extremely localized, and it is probable that morainal material at that point, derived from the basaltic Digby Neck to the north, would account for this localized colony of *Thuja* in a dominantly acid region.

The lower peaty and gravelly margin and beach of the lake had the usual plants of the lake-shores: *Carex lenticularis*, *Lobelia Dortmanna*, *Eriocaulon septangulare*, *Isoetes* sp., *Panicum spretum*, *Gratiola aurea*, etc., with *Botrychium simplex* forming a characteristic little patch at one point in the dry gravel; trees of the coastal plain *Acer rubrum*, var. *tridens* mingled with the common northern form of the species; and abundant in the gravel were great colonies of a pale-pink *Pogonia ophioglossoides* with the perianth not expanding as it does in the plant of bogs. Upon digging specimens we found that this characteristic gravel-beach plant is almost cespitose, the root-fibres extensively creeping and sending up at frequent intervals oblong leaves or flowering stems. Closer examination showed the lip to have no beard such as is conspicuous on the lip of the common bog plant or to have the beard represented only by extremely short processes; but, although we often found the plant at other lakes, there were transitional tendencies which show that it is only variationally separable.

The next day, July 12, after getting the Cedar Lake collection cared for and the presses in order, there was time for a short afternoon's collecting, so Long and Pease walked eastward to Arcadia, Linder and I south to the salt marshes and gravel beaches at Sand Beach. Puccinellias were in their prime, tantalizingly variable in stature and aspect, from 1.5 dm. to practically 1 m. tall, with dense or lax inflorescences but in technical characters all referable to *P. maritima*, the species already collected at Digby, common on Cape Cod, but in Maine unknown east of Casco Bay. *Agropyron*, too, as on the coast of New England and about the Gulf of St. Lawrence, was perplexingly variable and the group surely needs a master's hand, for altogether too many plants, both native and introduced, are passing under the blanket-name *A. repens*. A very pretty white-flowered form of the Sea Lungwort or Oyster-plant, *Mertensia mari-*

*tima*, was on the barrier beach, and back of the beach were two salt-marsh coves with boreal and austral halophytic sedges wonderfully mingled: in one cove the arctic *Carex norvegica* forming a pale turf close beside a tall colony of the austral *Scirpus Olneyi*, a characteristic species of such habitats from the West Indies and northern Mexico to the coast of New Hampshire; in the next cove a similar mingling of the boreal *Scirpus rufus*, previously unknown south of Cape Breton and the Magdalen Islands, and the curious "walking" sedge, *Eleocharis rostellata*, extending north from Mexico and Cuba to Massachusetts, and heretofore unknown east of an isolated northern station in Sagadahoc County, Maine.

Long and Pease had gone a mile or so beyond Arcadia village to the shores of Porcupine Lake,<sup>1</sup> where in the sphagnous margin of a rill they had again found *Schizaea pusilla*, there associated with *Arctostaphylos bulbosa* and very young specimens of a *Bartonia*. On dry gravel they had collected *Panicum subvillosum*, which soon proved to be one of the commonest species of the province, and *Antennaria petaloidea*, var. *subcorymbosa* Fernald,<sup>2</sup> a characteristic plant of eastern Newfoundland, Prince Edward Island and Nova Scotia, locally westward to the lower Penobscot in Maine, and found in very typical form by Bicknell on Nantucket.<sup>3</sup>

They also brought in very characteristic material of a tall shad-bush with the young leaves densely tomentose, the mature elliptic-oblong and acute, sharply and somewhat remotely toothed and obviously not like those of *A. oblongifolia*, so common in southern New England, but with ascending calyx-lobes much as in that species. They had been collecting the same thing before my arrival and afterward we found it one of the commonest large shrubs as far east as Queens and Annapolis Counties, either in peat or gravel. This material exactly matches the numerous specimens in the Gray Herbarium which Wiegand has identified as *Amelanchier intermedia* Spach.<sup>4</sup> as do specimens of a characteristic tall shrub of Prince Ed-

<sup>1</sup> The name Porcupine Lake is applied by the people of Yarmouth County to the unnamed lake of the topographic map slightly east of Arcadia; while the next lake to the east, called Porcupine Lake on the map, is universally known as Trefry's Lake.

<sup>2</sup> RHODORA, xvi. 133 (1914).

<sup>3</sup> Bicknell, Bull. Torr. Bot. Cl. xliii. 267 (1916); xlvi. 437 (1919): "Such plants of Nantucket as . . . and *Antennaria petaloidea*, var. *subcorymbosa* would scarcely be looked for from elsewhere than far to the east."

<sup>4</sup> See Wiegand, RHODORA, xxii. 147 (1920).

ward Island. Wiegand treats the species as belonging to the Piedmont and Alleghenian regions from Vermont and New York to North Carolina, there occurring chiefly in bogs. Its abundance in Nova Scotia and Prince Edward Island on either damp or dry soils suggests that it may be a Canadian species which southward takes to the bogs.

We were gradually growing into the habit of spending all our mornings in the barn caring for the presses and on July 13 it was, therefore, afternoon before we got away, all five of us by automobile, with the avowed purpose of going inland to Carleton or to Kemptville. Not far from Yarmouth we were tempted by a little pondlet, dignified by the wholly undistinguishing name Lily Lake, to stop long enough to "size up" the place, a bog-pond with quaking bushy margin, where we collected for the first time *Rosa palustris* Marsh,<sup>1</sup> and deep in the spruce thicket immature but thoroughly characteristic *Thelypteris simulata* (Davenp.) Nieuwl. (*Aspidium simulatum*),<sup>2</sup> heretofore unknown east of southern Maine but afterward found to be quite general on bog-barrens, in spruce swamps or in alder-thickets as far east as we worked in the Avalonian formation (Port Mouton and Broad River). This southern fern was growing with its regular southern associates, *Carex atlantica* and *C. Howei*, and nearby were the ubiquitous *Carex bullata*, var. *Greenei*, and *Thelypteris Boottii* (Tuckerm.) Nieuwl.,<sup>3</sup> which soon proved to be a common fern.

The next stop was a brief one, to prospect a little about the shore of Greenville (or Salmon) Lake. The water was high but *Isoetes*, as usual wherever we went, was already well fruited; *Xyris caroliniana* was becoming really recognizable; and, abundant in the boggy thicket, where in Maine or New Brunswick we should expect *Galium trifidum*, was the larger and smoother *G. tinctorium*, again a southern species not previously known northeast of Massachusetts.

We had gone but a short distance up the west bank of the Tusket River when, at Tusket Falls, we spied an extensive tidal flat, one of those "demd damp, moist, and unpleasant" stretches of ooze and slimy mud which is always sought by the properly enthusiastic field-botanist, for here there is good collecting. The tidal flats at Tusket Falls do not equal some in New England nor those on the

<sup>1</sup> See Fernald, RHODORA, xx. 91 (1918).

<sup>2</sup> See Weatherby, RHODORA, xxi. 174, 178 (1919).

<sup>3</sup> See Weatherby, RHODORA xxi. 174, 177 (1919).



lower Delaware, but they are good, giving us *Samolus floribundus*, *Juncus acuminatus*, the first east of the tidal reaches of the Penobscot, and *Myriophyllum humile*, again the first east of the lower Penobscot.<sup>1</sup>

Continuing up the valley, we saw much of a Staghorn Sumach, *Rhus typhina*, but here and, as we afterward noted, at some other stations in Nova Scotia, the pubescence of the branches is remarkably short and scanty, sometimes nearly wanting. At other stations, however, the pubescence is quite as long as we find it southward, so that there seems to be no constancy in the Nova Scotia variation. Somewhat north of Tusket (or Vaughan) Lake we again came upon the Inkberry, *Ilex glabra*, which had so amazed Long and me when we found it with *Empetrum nigrum* in the bog at Meteghan. But here it was dominant over a considerable area, not of bog, but of dryish rocky barren, associated with *Vaccinium pennsylvanicum*, *Myrica carolinensis* and the same handsome *Antennaria neodioica*, var. *grandis* which we had collected at Meteghan.

Our time was used up and we had not reached Carleton, but we were content with the afternoon's work and ready to return home. On the way back from the Tusket valley we had seen at several places roadside colonies of a tall Lupine, but our driver informed us that at Chebogue Point lupines covered many acres of hillside. Accordingly, on the afternoon of July 14 we drove to the Point to see them, one of the famous sights of Yarmouth County, great masses higher than one's head of blue-violet (occasionally pink or white) lupines covering the dry roadside-banks for a tremendous distance, two thoroughly naturalized species from northwestern America, *Lupinus nootkatensis* Donn and *L. polyphyllus* Lindl., both already known<sup>2</sup> as naturalized plants in the Maritime Provinces, but here growing intermingled and apparently freely crossing.

On the return Bissell took home the material already collected and the rest of us walked from Rockville back to Yarmouth, Pease and Linder by the eastern shore of the Chebogue peninsula, where they found more *Eleocharis rostellata* and with it *Galium trifidum*, var. *halophilum* Fernald & Wiegand,<sup>3</sup> thus proving that that northern

<sup>1</sup> Nichols reports *M. humile* as characterizing the sandy margins of lakes on Cape Breton (Nichols, Veg. No. Cape Breton, 350) but, as he now informs me, this record was based on the common lake-margin *M. tenellum*.

<sup>2</sup> See Fernald, RHODORA, xvi. 94 (1914).

<sup>3</sup> RHODORA, xii. 78 (1910).

species is not everywhere replaced in western Nova Scotia by the coastal plain *G. tinctorium*. Long and I followed the western shore of the peninsula nearly to the point at Sand Beach where, a few days earlier, Linder and I had stopped collecting. Along spring-rills everything was luxuriant and in such a habitat we collected *Eleocharis capitata*<sup>1</sup> exceeding in stature and length of spikelet the ordi-

<sup>1</sup> Dr. S. F. Blake has shown (RHODORA XX. 23) that the Linnean *Scirpus capitatus* has been misinterpreted and that the Clayton plant upon which it was primarily based is the familiar *Eleocharis tenuis* (Willd.) Schultes. Dr. Britton (Torreya, xix. 246) doubts this identification of the type of *S. capitatus*, saying: "It seems incredible that Linnaeus could have meant to describe the spikelet of that sedge as subglobose and to have assigned the name *capitata* to it. Linnaeus reached some results which seem queer to us . . . but these flukes are brilliant as compared with calling the spikelet of *Eleocharis tenuis* subglobose."

The Linnean description of the spikelet of *Scirpus capitatus* is, indeed, "spica subglobosa," but so is his description of the spikelet of the first species on the page (Sp. Pl. i. 48), *S. geniculatus*: "spica subglobosa." No difference between the two descriptions is apparent; nevertheless, no one, so far as I am aware, applies the name *S. geniculatus* or *Eleocharis geniculata* to any other than the tropical plant with as elongate-lanceolate or slender-cylindric a spikelet as can be found in the genus. Surely, if the latter plant, with a very elongate spikelet could be described by Linnaeus as having the "spica subglobosa," it should not seem incredible that he so described the ellipsoid to ovoid spikelet of *E. tenuis*.

In the same note in which Dr. Britton expresses his amazement at Linnaeus's description of *Eleocharis tenuis* he refers to the International Rules of Botanical Nomenclature as "forced down the throats of the Vienna Botanical Congress by a German majority and further manipulated by the same majority at the Brussels Congress," while the American Code "cuts out autocracy."

Such remarks from one of the original Commissioners who organized the Vienna Congress but who has treated the rulings of its tremendous international majority as "a scrap of paper," must seem like a huge joke to anyone familiar with the methods by which the American Code originated. The Nomenclatorial Congress at Vienna was presided over by Flahaut of Montpellier (although Dr. Britton had nominated von Wettstein), with Briquet of Geneva as *rapporteur général* (certainly neither of them Germans). There were 39 Commissioners: 4 of them from Germany, 3 from Austria and 2 from Hungary; while the remaining 30 were from non-German countries (1 from Uruguay, 2 from Belgium, 1 from Spain and Portugal, 4 from the United States, 4 from France, 4 from the British Empire, 2 from Holland, 3 from Italy, 4 from Russia, 1 from Sweden, and 4 from Switzerland); surely not a German majority. Nineteen authors of formally proposed motions were present, each with a single vote: 7 of them from Germany, Austria and Hungary, the remaining 12 from the United States, Switzerland, Russia, Norway, Italy, Great Britain and France; again not a German majority. Forty-five botanical institutions, each with a single vote, were represented: 6 German, 5 Austrian, 2 Hungarian (total 13); while the remaining 32 votes came from the following countries; Belgium 1, Denmark 1, United States 10, France 3, Great Britain 2, Holland 2, Italy 5, Norway 1, Russia 1, Sweden 3, and Switzerland 3 (total 32 as opposed to 13); again not a German majority! Seventy-two societies and academies had delegates with a total of 135 votes distributed as follows: Germany 23, Austria 9, Hungary 3 (total 35 out of 135), not an overwhelming German majority; Belgium 3, Denmark 3, Spain 4, United States 18, France 29 (more than Germany!), Great Britain 12, Holland 9, Italy 4, Norway 1, Russia 6, Sweden 2, and Switzerland 9 (total 100).

Article 20 of the International Rules, recognizing *nomina conservanda* (Art. 17ter, of the Texte Synoptique voted upon at Vienna), the Article so offensive to certain Americans, was adopted at Vienna by a vote of 133 to 36 (a majority greatly exceeding

nary measurements of the species, the culms being 7.5 dm. high, the spikelets 1.1 cm. long. One old springy field was brilliant with the red spires of *Rumex Acetosa* and with it was a gigantic species, at first glance taken for rhubarb, but quickly perceived to be a dock, the Butter Dock or Monk's Rhubarb, *Rumex alpinus* L., a very striking European species which has turned up casually in New England but here is thoroughly naturalized.

In a roadside ditch as we approached Sand Beach village we found a remarkable form of the ubiquitous and endlessly variable *Carex scoparia*, and when we got home we found that Pease and Linder had collected the same variation at another station east of Rockville. In this peculiar form the spikes are slenderly rhomboid and tapering to very slender, almost caudate tips.

Next day, July 15, there was time for an afternoon trip and since Bissell, Linder and I had begun to feel that "Longipes" had a tantalizing ability to turn up coastal plain specialties wherever they went and since we longed to be present at some of these thrilling discoveries, a new grouping for the afternoon seemed desirable. Accordingly when we drove eastward, Bissell, Long and Linder went to Tusket and Pease and I tried the borders of the beautiful lake erroneously called on the map "Porcupine Lake" but known throughout the region as Trefry's Lake.<sup>1</sup>

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the Germanic vote) and the Commission appointed to decide on the list of *nomina conservanda* consisted of Bonnet (French) Britton (American), Harms (German), Prain (British) and Briquet (Swiss)—again far from a German majority.

The same situation is obvious to anyone who sufficiently cares for the facts to read the records of the Brussels Congress. Flahaut (French) was again president, with de Wildeman (Belgian) general secretary. Of the 54 members of the Permanent Bureau and the Commission on Nomenclature, 12 were Germans, Austrians and Hungarians; 42 non-Germans. Of the 15 authors of motions present and voting 4 were German, Austrian and Hungarian; the others (11) non-German. Of the 50 botanical establishments having votes, 12 were German, Austrian and Hungarian; 38 not. Of the 108 votes by delegates from Academies and Societies, 30 were cast by Germans, Austrians and Hungarians; 78 by representatives of other countries (including 19 American, 20 French and 15 British). That these facts, which are simple transcriptions from the official published records of the Congresses, most certainly do not represent the "autocracy" of an overwhelming "German majority" should be evident to everyone. For many years prior to the Vienna Congress tremendous effort was expended by those who sincerely wished to bring uniformity out of the very diverse usages of local groups of botanists. The effective foundation-work laid at Paris (German?) was subsequently carried forward with unlimited self-sacrifice and far-seeing skill by Briquet, Flahaut, Rendle and others; and the sportsmanlike or statesmanlike spirit with which the vast majority of delegates, representing all sorts of pet views, abandoned their private wishes at Vienna, is one of the most impressive signs that, although a few "Neo-Americans" present were unwilling to concede anything, the botanists of the rest of the world were working disinterestedly for agreement.

<sup>1</sup> See note on p. 103.

Although the water was high, there was sufficient peaty, sandy and cobbly beach exposed for us comfortably to follow the margin of Trefry's Lake. At the upper border of the beach *Utricularia subulata* was so abundant as to form an interrupted orange-yellow band and with it, as at every station we subsequently found (nearly every lake visited in Yarmouth County), was *U. cleistogama*, the extreme plant with tiny creamy or milk-white or sometimes buff-tinged, spurless corollas, but with many of the flowers intermediate in size, form and color and often with short spurs. Such transitional colonies were repeatedly examined by Long and me; White and Bean, when they came, saw the two with their intermediates at Cedar Lake where White secured a beautiful photograph including the tiniest extreme (no larger than a slender "insect-pin"); and Dr. Graves, when at last he came, had his opportunity to collect the transitional series at Salmon Lake. These repeated experiences naturally destroyed the last lingering illusions that *U. cleistogama* is a species distinct from *U. subulata*. It is not even a good variety, being merely a cleistogamous form of *U. subulata*.

Since the preceding paragraph was written it has been gratifying to find that Bicknell's experience on Martha's Vineyard was so similar to our own. "Near Edgartown, on Martha's Vineyard, on September 30, 1912, there fell to me a most favorable opportunity of observing the extent of variation natural to the flowers of *S[etiscapella] cleistogama* among the plants of a single colony. The situation was a few square feet of damp sandy soil in open ground. In the weakest examples, some of them not over 1 cm. high, the corollas, 'not larger than a pinhead,' were subglobose or saccate, and white or faintly bluish in color, precisely as descriptions require them to be. But in stronger plants the corollas increased doubly in size and came also, by an exact gradation, to a distinctly two-lipped form, the blunt lower lip dusky or purplish lineate and with an evident white spur, the most open flowers showing an unmistakable yellowish tinge. The spur, obsolete in the smallest corollas, varied in the larger ones from rounded to oblong and acutish; in one instance it was bifid."

"In very small examples of *S. subulata*, unmistakable as to identity because components of colonies of the typical plant, the corolla, perhaps from arrested development, may be somewhat abortive and

reduced to a fraction of its normal size, and is sometimes palest yellow, or even whitish with a faint bluish tinge."<sup>1</sup>

The thickets by Trefry's Lake have a tantalizing complex of Black Alders, *Ilex verticillata* and its varieties or allies; but one of them was so unlike the ordinary forms of the species that we collected material. This proves, as we then suspected, to be the very characteristic shrub described by Bicknell from Nantucket and Martha's Vineyard as *Ilex fastigiata*,<sup>2</sup> an extreme of this group with fastigate habit and very small and narrow leaves. The same shrub was afterward seen elsewhere in Yarmouth County, and in October Linder and I collected fruiting specimens on the headwaters of the Tusket. Similarly, here as at many other places in the county, the High-bush Blueberries were baffling in their variations and in working back into the boggy thicket to do our reluctant duty by them we found ourselves in a characteristic growth of the Chain Fern, *Woodwardia virginica*, a coastal plain fern already well known from Nova Scotia but not before seen by our party, though subsequently we learned to regard it a dominant plant of boggy spruce swamps at lake-margins and sometimes even of cobble-beaches.

Coming to a point where the shore was impassible, we turned back into the spruce swamp, only to find ourselves impeded by a very familiar and unyielding obstacle, a dense tangle of the long-sought Green Brier or Cat Brier, *Smilax rotundifolia*; *Smilax rotundifolia* with its roots in a cold sphagnous bog, its lithe, green stems embracing the branches of the Hudsonian and Canadian White Spruce and Larch quite as contentedly as if clambering over the Tupelos and *Leucothoe* of Cape Cod. And back of the Green Brier tangle, the spruce bog, with its tussocks of the northern *Carex paupercula* and *C. trisperma* and its carpets of *Linnaea*, *Dalibarda* and *Cornus canadensis*, was almost uncanny with a dense undergrowth of Ink-berry, *Ilex glabra*, now in profuse bloom and swarming with bees. Incidentally, this shrub is considered in Alabama and some other southern states the most valuable wild source of honey, and from the swarms of honey bees which cover it in Nova Scotia it is apparent that it might there be made of considerable economic use.

We had not yet learned to rely on the almost regular lateness of the west-bound trains on the Halifax and Southwestern (part of the

<sup>1</sup> Bicknell Bull. Torr. Bot. Cl. xlii. 341 (1915).

<sup>2</sup> Bicknell, Bull. Torr. Bot. Cl. xxxix. 426 (1912).

government system) and in order to catch the last train to Yarmouth were forced most reluctantly to start on the three- to four-mile tramp to Arcadia station, or, rather, walking match with Pease, the champion of White Mountain trampers, as pace-setter.

The Tusket party, of course, brought in *Ilex glabra*, a shrub the rarity of which we were beginning to doubt, and Bissell maintained that the White-fringed Orchis, *Habenaria blephariglottis* of coastal plain peats, was growing at Tusket on the ordinary, dry railroad embankment. This was a rather "jarring" assertion to those of us who knew the plant southward only in wet sands or bogs, but we afterward abundantly verified it, for from now until mid-August we constantly saw this beautiful plant with milk-white racemes in the greatest profusion, not only on wet, boggy barrens but in ordinary dry pastures, spruce thickets and dry *Polytrichum*-barrens.

Long and Linder, hoping to add to the glories of the tidal flats of the Tusket, had spent some time on the muddy banks of the river which are here decidedly more saline than farther up at Tusket Falls, the rank grasses and sedges being chiefly *Spartina alterniflora* Loisel,<sup>1</sup> and *Scirpus acutus*, with *Scirpus Olneyi*, *Eleocharis rostellata* and *Deschampsia caespitosa* at the brackish upper border. The mud was too saline for a great variety of species but they had their reward in *Zannichellia palustris*, var. *major*,<sup>2</sup> *Limosella subulata* Ives<sup>3</sup> and, best of all, that most amazing of all our *Umbelliferae*, *Lilaeopsis lineata*, always exciting wonder by its unique habit and habitat; the

<sup>1</sup> See Fernald, RHODORA, xviii. 178 (1916).

<sup>2</sup> In 1918 it was pointed out (RHODORA, xx. 160-164), that in America typical European *Limosella aquatica* L., although known at the Straits of Belle Isle, is mostly confined to the western sections of the continent, the plant of the Atlantic coast being *L. subulata* Ives. Similarly, the typical European *Zannichellia palustris* L. seems to occur in North America only in the western half of the continent, from Saskatchewan to Iowa, Missouri and Texas, thence west to the Pacific and south into Mexico, the plant with sessile or subsessile fruits, the body of the achene 2-2.5 mm. long. The plant of tidal or brackish pools and shores all the way from Florida to Newfoundland is var. *major* (Boenningh.) Koch, this plant having the fruit definitely pedicelled and rather long-beaked, its body 2.5-3.5 mm. long. It may have either free-swimming or closely repent stems, but throughout its range along our Atlantic coast it has the fruit-characters remarkably constant. The bibliography of our plant seems to be:

*Z. PALUSTRIS* L., var. *MAJOR* (Boenningh.) Koch, Syn. Deutsch. und Schweiz. Fl. 679 (1837). *Z. major* Boenningh. ex Reichenb. in Moessler, Handb. ed. 2, iii. 1591 (1829); Reichenb. Ic. Bot. Crit. viii. 24, fig. 1005 (1830) and Ic. Fl. Germ. Helv. vii. 10, t. 16, fig. 24 (1845). *Z. intermedia* Torr. Compend. 330 (1826). *Z. palustris* Race *Z. dentata*,  $\beta$ . *major* (Boenningh.) Rouy, Fl. Fr. xiii. 298 (1912).

<sup>3</sup> See Fernald, RHODORA, xx. 160-164 (1918); also Pennell, Torreya, xix. 30-32 (1919).

stems creeping in saline mud, the leaves being erect and fleshy club-shaped bodies 2–8 cm. high. *Lilaeopsis* is one of those interesting genera of a few closely related species and a range southward through South America, but in the eastern hemisphere known only in Australia and New Zealand. But in case of the Tusket plant the usual thrill of finding this unique little plant was intensified by the knowledge that it is an addition to the flora of Canada.

Friday, the 16th, brought White in the morning by boat and Bean in the afternoon by train and an appropriate initiation was provided by setting them to work changing driers and “salivating”<sup>1</sup> specimens preparatory to an early start next day on a long circuit, to see the country along the southwest coast as far as Halifax and to explore various spots already noted from there to Amherst on the New Brunswick border, and westward into Annapolis County. The trip started auspiciously on the 17th, with the party increased to seven, and, as we watched the country from both sides of the train, we were “all eyes,” noting countless promising barrens, lake-shores and sands for future exploration.

(To be continued)

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## SIUM SUAVE: A NEW AND AN OLD FORM.

NORMAN C. FASSETT.

SIUM SUAVE Walt. forma **fasciculatum**, forma nova, repens vel suberectum; foliis imis ad foliolum terminale solitarium 1–3 cm. longum reductis, petiolis valde elongatis 1–2.5 dm. longis, foliis caulinis plerisque secundariis etiam pinna solitaria terminale parva (4–17 mm. longa) suborbiculari instructis in axillis primariis fasciculatis a basi cormiforme ovoideo-subglobosa saepe 5 mm. diametro orientibus.

<sup>1</sup> The “salivation” of specimens is a simple, but apparently not generally known, method of securing superior results. In my own experience, at least, the method originated impulsively at Carleton, Quebec, in July, 1904, when Collins, Pease and I were distressed at the failure of flowers of *Parnassia* and leaves of *Pinguicula* to stay opened out after the plants had received their first pressure. Impulsively tearing off a bit of newspaper and moistening it with my tongue, I applied it to the curling petals and leaves with the instant result that they were held closely to the pressing paper. These bits of paper, promptly dubbed SALIVATORS and when needed in quantity moistened in a dish of water, are now considered indispensable by those who have learned the trick and by their use nearly all obstinately curling portions of a specimen can be held in place. The slips are left in press during successive changes of driers and eventually flake off. A modification of the method is to moisten a spot on the pressing sheet when the specimen is originally put in press and on this wet spot to spread out (up-side-down) the refractory petals or leaves.